WHAT IS CLAIMED IS:

1. A method of measuring the stiffness of a cultured tissue for the determination of the amount of a produced matrix of a tissue cultured in vitro or for the determination of transplant compatibility of the cultured tissue based on the amount of the produced matrix, said method is carried out by using a stiffness measuring device, said stiffness measuring device comprising a detecting unit, and a calculation means, said detecting unit including a contact unit, a vibrator connected to said contact unit, and a vibration detecting unit for detecting the vibration of said vibrator, and said calculation means determining stiffness information by calculation based on the detected result from said vibration detecting unit; the method comprising the steps of:

bringing said contact unit into contact with the cultured tissue, and measuring the stiffness of the cultured tissue.

2. A method according to claim 1, wherein said detecting unit further comprises a load detecting unit for detecting a load applied onto said contact unit, and wherein the stiffness of the cultured tissue is measured based on a relationship between the vibration of the vibrator detected

by said vibration detecting unit and the load detected by said load detecting unit.

3. A method according to claim 1, wherein said detecting unit further comprises a displacement detecting unit for detecting a displacement of the contact unit from a reference position, and wherein the stiffness of the cultured tissue is measured based on a relationship between the vibration of the vibrator detected by said vibration detecting unit and the displacement detected by said displacement detecting unit.

4. A method according to claim 1, wherein said cultured tissue includes at least one of a cell and a matrix produced by said cell, said cell being seeded and cultured on a tissue regeneration scaffold having a three-dimensional structure, wherein the stiffness of the tissue regeneration scaffold alone on which no cell is seeded or the stiffness of the cultured tissue immediately after the seeding of said cell is previously measured and the resulting stiffness information is defined as reference stiffness information, and wherein said reference stiffness information is compared with the stiffness information of the cultured tissue.

5. A method according to claim 4, wherein said tissue

regeneration scaffold comprises at least one selected from the group consisting of collagen, gelatin, hyaluronic acid, fibronectin, fibrin, chitin, chitosan, laminin, dermatan sulfate, heparan sulfate, chondroitin sulfate, calcium alginate, calcium phosphate, calcium carbonate, polyglycolic acid, polylactic acid, and polyrotaxane.

6. A method according to claim 1, wherein the cell constituting said cultured tissue is at least one selected from the group consisting of chondrocytes, osteoblasts, fibroblasts, endothelial cells, epithelial cells, myoblasts, adipocytes, hepatic cells, nerve cells, and progenitor cells of these cells.

7. A method of determining the transplant compatibility of a tissue cultured in vitro, said method using a method for measuring the stiffness of a cultured tissue according to any one of claims 1 to 6.

8. A method for the quality control of a cultured tissue, said method comprising the steps of:

measuring the stiffness of an in vitro cultured tissue at a predetermined time after the initiation of culture;

predicting a change in stiffness of said cultured tissue with time after measurement; and

controlling culture conditions for said cultured tissue based on the resulting prediction.

9. A method according to claim 8, wherein the stiffness of said cultured tissue is measured using a stiffness measuring device, said stiffness measuring device comprising a detecting unit and calculation means, said detecting unit including a contact unit, a vibrator connected to said contact unit, and a vibration detecting unit for detecting the vibration of said vibrator, and said calculation means determining stiffness information by calculation based on the detected result from said vibration detecting unit.

10. A method of preparing a transplant-compatible cultured tissue, said method comprising the step of:

measuring the stiffness of an in vitro cultured tissue at a predetermined time after the initiation of cultivation in order to determine the transplant compatibility of the cultured tissue.

11. A method according to claim 10, wherein the change in stiffness of said cultured tissue with time after measurement is predicted based on the measurement of stiffness of said cultured tissue, and the culture

conditions of said cultured tissue are controlled to thereby prepare the transplant-compatible cultured tissue.